CHAPTER 8: SURVEYING THE FIELD

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IDRC's strategy for support to subsaharan Africa drew on replies to a letter (see attached) sent to relevant national and international agencies and individuals knowledgeable about information science in Africa. The letter solicited input on the items for discussion at the workshops to be held in Dakar and Nairobi and on any other pertinent issues.

This chapter summarizes the responses and includes edited comments from the letters. While we have attempted to represent respondents' opinions, some distortions may have occurred in our interpretations. As the points of view in this sampling at times conflicted and the contributors did not have the opportunity to debate or support their ideas, we have disguised many of the sources; however, we have included specifics for some responses, especially for those outlining activity in progress.

We acknowledge with great thanks all who took the time to record their concerns on the role to be played by information science in the development of subsaharan Africa. A total 42 substantive replies came from Africa and 42 from elsewhere.

In the Eastern and Southern African region, 95 letters were sent out; of the replies, 24 contained more than simple acknowledgments. Documentalists or librarians accounted for just under half (48) of the letters sent out in East Africa and more than half (14) of the responses. For West and Central Africa, 14 of 40 requests elicited comments, and the 100 letters sent from IDRC's headquarters in Ottawa prompted 46 replies. Respondents usually addressed more than one topic, and development of human resources surfaced repeatedly in comments from every region.

From Eastern and Southern Africa, 17 respondents dealt with human resources, 14 with infrastructure, 11 with scientific and technical information, 9 with information tools, 8 with rural information, 7 with socioeconomic information, and 5 with funding.

In West Africa, respondents were concerned about scientific and technical information and socioeconomic information as well as human resources. One respondent dealt with use of information tools and technologies; all but two of the replies addressed practical rather than conceptual issues.

Date

File:

Name and Address

Dear_____:

Subject: Information Sciences: An African Strategy for IDRC

The Information Sciences Division of the International Development Research Centre is in the process of developing a medium-term, need-based strategy for our Division's support to sub-Saharan Africa.

We are writing to ask you to participate in the process by correspondence. Our agenda is described below, and full details are enclosed with this letter.

African specialists from Anglophone and Francophone countries have been commissioned to prepare studies on a total of seven topics to be discussed at two consecutive workshops in March 1987, the Anglophone one in Nairobi and the Francophone one in Dakar.

The seven topics selected for discussion are:

(i) The need for Scientific and Technical Information in sub-Saharan Africa;
(ii) The need for Social and Economic Information in sub-Saharan Africa;
(iii) Information Systems in Support of Rural Development;
(iv) Human Resource Development;
(v) Information Tools and Technologies
(vi) Information Infrastructure Development and Institutional Support, and
(vii) Funding and Sustainability of Projects/Programs.

Detailed terms of reference provided to the commissioned specialists are enclosed for your information.

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We are also inviting input from relevant national and international agencies and individuals knowledgeable about Africa, and would welcome any comments you could contribute from your own experience and perspective, whether on the abovenoted topics or any other pertinent issues. An early response would be very much appreciated, to allow us to ensure its inclusion in the deliberations at the abovenoted workshops.

Enclosed, for your information, are brochures describing the work of IDRC and the Information Sciences Division.

We thank you in anticipation for any help you may be able to give us in this matter. We would be pleased to share with respondents a note on the outcome of the workshops.

Yours sincerely,

Shahid Akhtar,
Associate Director,
Information Sciences.

Encls.

SA/cc

The replies to letters sent from IDRC headquarters included comments from 20 countries -- 4 in Africa, 3 in Asia, 11 in Europe as well as Canada and the United States; Canada and England -- each with 10 -- dominated the responses, with 1 or 2 responses coming from each of the other countries. Representatives from 9 UN agencies responded as did 3 from international agricultural research centres outside Africa. The bulk of replies to the letters sent from Ottawa came from donors or members of the development community outside Africa; a few of the letters to national libraries, universities, and statistics departments elicited substantive responses. Most of the replies from agencies outlined their activities and expressed interest in closer links with IDRC. Human resources development, promotion of and tools for information services, and coordinating activities of donors and national bodies were major focuses.

Seven of the respondents to the survey from Ottawa sent copies of project proposals, some of which have been tabled and others of which have been launched. Several respondents sent along publications. A look at some of the responses indicates the variety of insights, including some comments about the role of information sciences in development.

ROLE OF INFORMATION SCIENCES

In East Africa, where politeness is valued highly, a few respondents expressed doubts about information sciences' having any role in development. One respondent said: "The argument is not against the use of high-level technology in the information profession in Africa. On the contrary African librarians and other relevant information persons should adopt a needs-oriented strategy to keep our professional house in order. We can then take advantage of the enormous benefits that emerging technology offers to the information profession. My main concern is that at the moment we are not ready to do this, not without an industrial base; not with collapsing economies; and, as painful as this may be, not even professionally. In plain language, we do not have the money; we do not possess the know-how; and we do not have the relevant infrastructures."

Another commented: "African information specialists know of developments in information technology. A few have been exposed to them personally, but what we know is that the continent's economic plight precludes a meaningful adoption of the new technologies. Professionally, also, we lack the skill mix that will enable us to fully understand and manage the systems acquired."

Others expressed doubt about the seriousness of IDRC's efforts to involve Africans in a strategy for the continent. One respondent summarized the key arguments:

"I wonder how much time the authors were given to prepare the papers. Even if they were given as much as 6 months, they may not be able to write a comprehensive paper on such a large region as Africa.

"It is practically impossible for an author in Zambia, for example, to critically examine the nature of the problems of scientific and technical information in Ghana, Nigeria, Sudan, Ethiopia, Uganda, Kenya, Swaziland, Botswana, etc. when the only sources of information available to him or her are the background reading materials you provided and a few, most likely outdated, reference materials in his or her library. I cannot see how one can write comprehensively about such a big region. If smaller areas like East, West, Central, and Southern Africa were to be written about by authors and then the papers were compiled, a more comprehensive subregional picture would be obtained."

Others did not question the intention to involve Africans but had comments about the approach.

Said one: "It is commendable to ask Africans to define their needs but concurrently those who have surveyed the region would be well advised to start identifying and mapping those centres of excellence with a good reputation for prompt and efficient response. This would provide a safe anchorage for the deployment of the strategy and the necessary linkages for workers already in the field."

Another said: "I believe that IDRC does accept to involve us in its plans to evolve a concept of an information science reflecting African initiative, needs, and application to African problems, but let us not wait for IDRC to tell us what to do. What is wrong with the application of wisdom and knowledge generated in Africa to the solution of African problems? We must play the role of change agents. This must come from our own conviction that we possess knowledge and wisdom that is valuable to the overall development of our nations."

A few respondents expressed happiness that IDRC was "taking a more integrated approach in developing a new strategy, rather than the adhocism that has tended to characterize some of the past efforts" and generally they acknowledged the absence of links among various information services.

One noted some deficiencies in the agenda: "I have the feeling that some points are neglected: the status of information professionals in both the public and the private sector; job motivation, satisfaction, and performance; staff turnover; lack of effective professional organizations; lack of information science research on, for example, what is appropriate information. I am also a bit uncomfortable with the objectives of the exercise. Although each agency should certainly choose its own strategy, the latter can hardly yield positive results unless it is coherent with the strategies of other agencies. I was also surprised by the relatively short list of background readings. I would have expected that these workshops provide an opportunity for a comprehensive review of the literature. I doubt that the commissioned authors would have easy access to the relevant literature and it would have been helpful to provide them a good bibliography and the documents they selected from it."

Several people thought we were issuing a call for papers as an

invitation to a meeting, and some requested the background papers sent to the participants in the workshops. When requested, the papers were forwarded.

One person noted that our request was too general, saying: "I am much better at addressing specific and smaller issues and brainstorming in person."

Another generalized: "There should be a greater exchange of scientific and technological information between developing countries in as large a number of fields as possible to maximize information inputs and obviate to some extent the danger of underutilization of equipment capacity inherent in the building up of information services and systems."

Many respondents had obviously given much thought to the issues. Said one: "The great mission of information is fundamentally to instruct, inform, and transmit to certain individuals scientific and technical facts and ideas by the most appropriate methods."

Within this general mission, the needs for scientific and technical information were regarded as permeating all levels of society. Someone else took the idea further: "Information °or its control§ has become a factor in political, military, and economic inferiority and cultural subjugation."

One respondent said: "Practical application of science and technology presupposes that the knowledge and information be readily available -- documented, processed, and promoted through appropriate systems. Inappropriate information or none at all may lead to failure of development projects, duplication in the areas of research, and the taking of untimely and unworthy decisions. Researchers, farmers, agroindustrialists, planners, and import-export industries all need to keep abreast, to monitor developments in their fields, and to adopt modern practices. However, to meet these needs the African continent has perhaps the least developed scientific information system."

No one disputed the need for information, but how to absorb, process, and disseminate it in a directly usable form was less clear.

CURRENT ACTIVITIES

To some degree, said African respondents, attempts are being made to address most of the needs; the reported activities fit with the priorities identified -- agriculture, livestock raising, fisheries, forestry, public health, and industry. Specifically cited were INFOTERRA's services -- "not only the search of a wide range of databases but also the delivery of documents" -- ILCA (International Livestock Centre for Africa), and CGIAR (Consultative Group on International Agricultural Research). Some respondents mentioned activities that were promising, such as Agritex in Zimbabwe, which was lauded as a prototype for agricultural extension.

One respondent wrote about a service for documents of standards: "Standards are a unique source of information covering virtually all sectors of industrial and economic activities. Professional specifications developed by various bodies around the world amount to 400 000 documents. This literature is managed by about 100 specialized information centres, 20 of which are operational in Africa. Centres in Africa are organizing themselves into a network by sharing their resources through the proposed African Regional Standards Organization, Documentation and Information Network (ARSO- DISNET) on standards and technical regulations."

A submission from East Africa noted that the ministry of industry in one country was implementing a management information system project based on a study of the organizational structure; information flow within, to, and from the organization; problems encountered in supporting firms, supervising corporations, and monitoring departments within the ministry; data processing considerations; documentation needs; equipment suppliers; and some user installations in the country. According to the submission, the study pointed to requirements for information to be collected about operations, sales, personnel, finance, and projects, as well as planning data that result from budget preparation.

Said another: "With financial support from the United Nations Development Programme, the Communaute economique de l'Afrique de l'Ouest recently created a subregional centre for commercial information and documentation in Abidjan."

One respondent dealt with education, summarizing governmental activities locally: "By 1986 enrolment in basic education was growing very fast at 20.8% per year. Thus the existing study on needs for information approaches the problem from the point of view of planning and managing the educational system. Accordingly, the study called for improvement in the quality of statistical data collected; an extension of the range of data collected; an increase in the capacity for processing data; and an effort to raise the capacity for use of data in inventory control, general ledger systems, cost accounting, budget control, database management of school systems, and administration.

"With these objectives, the ministry of education has started a 4-year program of building capability. However the application of informatics need not be confined to the monitoring and planning of the educational system. Definitely, the use of informatics in the deliverance of educational materials and making textbooks and lecture materials available at the sparsely distributed schools has not been examined. Neither has the use of information technology to ameliorate the teacher/student ratio."

Another respondent focused on activities of the labour department, noting that some statistics are routinely collected, even though, as yet, they are not being systematically analyzed: "The labour department in collaboration with the national statistical office collects routine information on status of employment and conducts specialized surveys on urban employment, classification of occupations with related

requirements for skills, registration of job sectors, and annual collection of labour statistics. The desired system of information has not yet been outlined."

Together, the letters received from around the world are a general appeal to researchers, information professionals, and decision-makers to reach out to each other to find out how they may best ensure the efficient development and application of research. Some excerpts of what was said about rural information, human resources development, information tools and methods, building an infrastructure, and funding appear on the following pages and complement what has been gleaned from meetings to design a strategy for information sciences in subsaharan Africa.

RURAL INFORMATION

Most respondents who addressed issues for rural development information systems viewed the activities as solely dissemination and broadcast. One, however, referred to rural peoples as a source of information: "There is an urban emphasis in our services. Information should be directed more to rural and community development, to grassroots. There needs to be greater emphasis on information of local origin."

Another noted: "Many countries are looking at district/village levels as the forms for scientific-technical-social-economic development efforts," and went on to say, "effective data catchment and provision systems must be so designed as to take care of this approach. However the same systems may not be in a position to satisfy the rather sophisticated informational requirements of industry and science and technology departments in universities and colleges. Yet whatever the differences, the various systems must be interlinked, for the village information service could serve as the breeding ground for ideas that could later be listed by research and development organizations for application."

The common perception was: "The information systems that support rural information are networks of rural libraries operated by the national library service; ministry of information library service; rural newspapers; extension staff of ministries of agriculture, livestock, health, provincial administrations; radio and television; national daily and weekly newspapers; and nongovernment organization programs. The purposes of the information acquired through these media are to enlighten the public on government plans, policies, and achievement; supplement formal education; support nonformal education (such as literacy programs); and facilitate reading as education for self-reliance, individual intellectual development and better use of leisure time."

Several comments made the rural farmer seem remote -- almost as if rural peoples are figures from the past instead of being the majority in today's Africa. Others recognized the central role of agricultural activities but saw no hope in the near future of involving farmers in information activities.

One respondent said: "The farmers are the principal actors of the rural development process and as such they become the main target of knowledge transfer. But only after they have undertaken literacy programs will we be able to discuss logically problems related to the development of information and documentation facilities and their use in rural communities. While waiting for literacy for rural populations, extension workers should act as information relays from research centres and libraries to rural communities."

Another respondent commented: "Extension workers need preprocessed and repackaged information in a medium and in a language accessible to the majority of the illiterate rural community. They need information on practices that have been tested and proved useful to farmers. However, extension workers are rarely found reading in libraries because there are no library facilities in the rural areas to cater for them; or if libraries exist, they do not have the relevant literature. Furthermore, the link between research findings and farm practice is poorly organized. Hence, findings are not applied; the information needs of the rural community not identified and understood. Extension workers should benefit from refresher courses and continuous training to enable them to constitute a bridge between the researcher and the farmer. These courses should also show them techniques on developing information products and services for the farmer."

The magnitude of the job is put into perspective when one considers that currently, in Africa, extension workers number about 1 for every 2000 farmers.

One respondent suggested introducing "barefoot information services, repackaging of scientific and technical information, and strong interagency coordination of extension agencies involved in rural information work."

Another called for "research on the role and contribution of a library service that enhances adult education and that is relevant to the interests of villagers to improve their knowledge and sustain their reading skills," because "there is a general correlation between level of education, reading activity, and use of library services, and, therefore, rural public libraries have always had very close links with adult education, in roles of support and direct provision."

One respondent described an early warning system for food shortages in the context of rural information systems: "A number of government agencies have been active in attempting to solve the problem of lack of reliable indicators and control variables for planning rural development and specifically for forecasting the food situation. However, in the past, each data system reflected the planning needs of the agency concerned and focused on its activities. The analysis of the data and the level of collection and aggregation were not adequate to monitor food actually available to the population of a rural area. Moreover, the timeliness of the information was limiting. Thus the early warning system was set up with the objectives of providing data that warn of impending food hortage, information on deficit and

surplus-producing areas for market stabilization, information on management of regional food shortages, and quantitative information on the planning and management of regional food supply.

"The information is to come from crop monitoring; monitoring pastoral conditions and animal production in rangeland areas; monitoring prices and supplies; strengthening and extending meteorologic reporting; monitoring the status of community and family food stock, dietary intakes, and nutritional status."

The respondent envisioned: "establishing a system for efficient data processing and intersectoral analysis, a system of relaying, to all agencies responsible for action, the results of the data collected in a clear understandable form, and models that define the relationship between aspects that determine food availability."

This early warning system is said to be one of the most functional in Africa but is an expensive venture.

A respondent from West Africa mentioned efforts by SAFGRAD (Semi-Arid Food Grains Research and Development Project) to forge some links between agricultural researchers, extension workers, and farmers: "SAFGRAD has been successful in organizing peasant days at the test sites of research stations with researchers present. These facilitate free and open dialogue between all involved." This type of direct communication could be extended using modern technical equipment (audiovisual support, radio, etc.). Moreover every researcher and development agent in the countries is a potential communicator and trainer."

HUMAN RESOURCES DEVELOPMENT

As most of the respondents were information professionals, they had much to say about shortcomings in human resources development in the field. The other respondents also dealt with the training of information workers, policymakers, etc. One staff member from the UN commented: "Please note that my office is currently developing a project document on the development of indigenous capability in Africa with emphasis on educating the educators in remote sensing technology."

The thrust of comments from Africa was that the profession is passive, unprepared, underpaid, and out of touch. Said one respondent from anglophone Africa: "Years of experience and keen awareness of the peculiar needs of African librarianship learned on the job have led to invaluable service in the management of the libraries of the region. Most of the British-trained professionals had their experience in the conventional library because this was before the information age. Some of them have managed to keep abreast. However, the majority have failed to take advantage of the new opportunities on a formal basis either because they think they are too old or because they have not considered any such upgrading necessary in the circumstances in which they find themselves."

Another said: "Existing personnel are passive and do not react to pportunities to go outside their institutions for cooperation in resource sharing."

The reasons for passivity and disinterest came out of several letters; for example: "Training policies and programs on information systems should be associated with realistic salary structures for trained personnel so as to stem the present exodus of existing and newly trained information technicians and scientists from developing countries to more advanced countries or even from public to private sector."

Also, "Funds should be allocated to supply regularly publications in the information field to key information specialists as a means of continuing education."

The list of disincentives included reliance on experts from outside the region. Said one respondent, "The issue of human resources development is central to past, current, and future programs in Africa. However, what is equally and probably more important is the issue of human resources utilization. The most serious aspect of the brain drain is often overlooked: a multitude of qualified and capable individuals are idle in their own countries. In several instances, their talents remain unrecognized and unutilized, unchallenged, and misdirected."

Another noted: "There is a tendency to perpetuate dependence on foreign expertise at the expense of indigenous expertise. Levels of national development are not uniform and the cultural context within which certain ideas must be interpreted are never the same, although similarities may be discerned in a particular region."

This respondent issued an imperative: "Distrust uninformed and arrogant foreign consultants whose ill-prepared advice is given on the basis of 2 months' experience. I urge IDRC to examine critically the possibility of engaging experts from within the region to carry out consulting missions."

Opportunities for Training

A related problem cited by another respondent was: "Local training has generally been concentrated on paraprofessional and subprofessional levels. Graduate and postgraduate level training is often undertaken overseas. Because graduate degrees are shorter and therefore cheaper for aid agencies, the paraprofessionals are likely to be overtaken by new entrants to the profession who enter at the graduate level and are promoted over persons with longer service."

The commonly mentioned difficulty in providing relevant training outside a country was the focus of several responses. One said: "There is a tendency to respect qualifications from developed-country universities and a tendency of donor agencies to give preference to home institutions. However outside training programs will not be relevant to the developing-country circumstances and the technology

used in training may not be available. Frustration results and leads o turnover of staff."

From Senegal, where human resources are relatively strong, a respondent reported that the lack of opportunities for paraprofessionals -- in librarianship, documentation, and archives -- threatened the services offered by his institute. The argument was that such people are indispensable for execution of routine technical tasks and that the established document-handling institutions in the region should take on the responsibility for training the cadres, with government recognition of the diplomas.

Some approaches to dealing with shortcomings in training were put forward. An international association for the profession in West Africa sent in a response, urging national, subregional, and continental associations for information scientists to contribute to strategies for development of social, economic, scientific, and technical information in Africa. It also stressed training as a means to improve the status of the profession on the continent. Specifically, it recommended IDRC organize practical courses and reorganize public libraries that currently exist in Africa. The submission went on, "IDRC could make a valuable contribution by not restricting itself to the development of information and the application of sophisticated techniques but rather by helping the working masses who have a right to documentation and information."

One respondent summed up the thinking in several letters: "First of all, a survey of the manpower needs of the individual countries is a priority requirement. This important initial survey has never been done in any African country. Ad-hoc training, pursued without awareness of the exact target population and areas of training, has filled the profession with generalists who cannot respond adequately to the special challenges of the information profession and the information needs of troubled African economies."

Another said: "Provide specialist focus in general training programs to prepare staff for work in agricultural information centres, population documentation centres, social science and scientific databases, research information centres on tropical diseases, outreach services, and a host of other mission-oriented information systems that will surely address some of Africa's pressing information problems."

Still another noted: "Since about 70% of sci-tech information and probably a much higher percentage of databases are in English, the curriculum needs of the anglophone countries are different from other countries where some emphasis must be on translation. Keyboarding errors are common in words that are almost the same in different languages and prevent retrieval unless an intelligent front-end is programmed to pick up such mistakes."

Someone else commented: "For skilled information technologists and paraprofessional information workers, the emphasis in training should be on interpreting and repackaging information for ultimate users -
- especially peasant farmers."

Some respondents mentioned programs their organizations provided. For example, one said: "The information and documentation training section of Deutsche Stiftung fuer Internationale Entwicklung (DSE, the German Foundation for International Development) carries out training programs each year for personnel from East and Southern Africa; for example, in 1987, the program consisted of five courses -- 4 days to 1 month long; subjects included basic concepts of bibliographic and documentation work; establishment and management of national information services; introduction to librarianship and documentation; curriculum adjustments; and agricultural information services. Partner institutions are the Eastern and Southern African Management Institute, the University of Botswana, and PADIS."

Another noted: "The Commonwealth Secretariat publication Rural Community Resource Centres: A Guide for Developing Countries is to be published. The guide advocates the involvement of the community in setting up its own information and learning resource service and details the task of the information officer as the coordinator for information exchange. A training guide will also be available."

As well, "Library schools in Africa are a recent phenomenon. Any assessment of the existing library schools should take cognizance of the background (professional) in which they were established and the existing systems they prepare people to serve. By and large, library education in Africa was fashioned on the colonial model. People were needed to staff conventional libraries, even special libraries; therefore the traditional core library topics of cataloguing and classification, acquisition, library administration, reference and bibliography, and circulation formed the content of the school curriculum. The conventional librarian will be needed in the African environment for a long time, but after two decades and more of training this type of professional, we need to take stock of our programs and see whether the new development needs do not demand a change of focus, a reordering of priorities in information training programs."

The direction of the change was suggested by a response from West Africa: "In workshops and other training activities for information personnel, attention should be devoted to the mediators' role in viewing people as both producers and consumers of information."

Someone from outside Africa commented: "The traditional training of librarians should be retained to maintain academic and research libraries, but more emphasis needs to be given to the provision of services to the majority -- i.e., those who will never have the education or the opportunity to use libraries based solely on the printed word, often in a foreign language. Training should be greatly expanded to include a sound basis in adult education, literacy, community, development, and communications; methods of analyzing, repackaging of information; practical skills such as typing and bookkeeping; alternatives to traditional forms of information."

A group of respondents addressed the issue of training for personnel in informatics, pointing out that except for training upport by

computer hardware sales companies, applications training in data processing and informatics management is nonexistent on the continent.

"Manpower planning is important in both the short and the long term for adoption and adaptation of informatics technology because the lack of trained personnel affects maintenance of existing systems and stultifies the development of new applications as well as their implementation."

Along the same vein, another respondent said: "Information technology depends on the computer industry in terms of a cadre of personnel needed to plan, design, analyze, implement, test, and maintain information systems software. There are also the engineers and technicians needed to maintain the hardware such as computers, communications systems, and microelectronic components in general.

"The major problems in getting and training staff are that there are no national training centres; the local training provided by companies is not adequate; education opportunities at higher levels are not available; funds are not available for training staff abroad; managers are reluctant to pay for training and to have their staff away on courses; people with an aptitude do not join the profession because of low pay; and rigid recruitment procedures cause difficulty in selecting the right kind of people."

In sum, said another respondent: "There are no full-scale professional training programs in informatics in the universities. The training that is available is oriented toward users and specific applications and is promoted by computer system dealers."

One respondent directed comments toward IDRC: "I see very little hope of success for the two regional postgraduate programs in information science in anglophone Africa (at Ibadan and Addis Ababa as recommended by IDRC and Unesco). I think there are too many contending forces that make it extremely difficult for a regional institution to balance its activities to the satisfaction of each participating country within the region."

Although the focus of most responses about training was the information worker, some respondents commented on the preparation of users. Said one: "Use of information is not taught in universities. Users seldom look for new information and keep using what they already have. Scientific publication is not in their mother tongue, so information begins to be regarded as a luxury. People already live without many essential things -- among them, medicine and medical care -- as well as books and up-to-date information."

Another level of users was the focus of this response: "There is a lack of recognition by decision-makers of the crucial role information plays in development. There should be programs to influence the influencers like the ones once operated by the Coordinating Centre for Regional Information Training and the German foundation for international development (DSE)."

One reply from a UN centre said: "If information is going to be available for government decision-making and to support the sharing of experience in the region, the government officials and managers must be convinced that information (particularly indigenous information) has a role in development. One would need some African case studies that show how information has helped people get involved in the development process or has made development programs more effective."

A corollary was: "Senior managers of major national and regional institutions do not see the relevance of including an information systems' perspective in planning for organizational structure. An information component needs to be included in general management training programs."

Another respondent commented: "Decision-makers -- that popular but imprecise term -- require digests of information and clear presentations of relevant facts and data. Even professors of science like reviews of progress in a field rather than to read all the original texts so information systems need to include brokerage or analysis services; Also, general training for staff in industry, commerce, and government services as well as scientists should include a thorough grounding on acquiring, selecting, repackaging, digesting, assessing, and presenting information."

Said someone else: "We need to think about distance learning programs based on expanded information services. The combination of selective dissemination of information (SDI) and reprints obtained through a current titles service now gives isolated scientists self-training opportunities. It is now possible to consider a partial replacement of traditional centralized supplier-defined training programs with information services of sufficient diversity so that users can satisfy their own perceived needs."

INFORMATION TOOLS AND METHODS

Others commented about the difficulties in finding out details about technology. Said one: "There is a great need for computer literacy among the current information professionals and a great need for cooperation among all professionals in information fields."

Another noted: "Even we in the information world need information on what technology is available. We need advice on what technology is best for our particular needs and what latest developments have taken place."

Several respondents echoed this concern about technology -- especially computers; the letters suggest that many have serious doubts about the appropriateness and the directions of what is going on.

Said one respondent: "The much-cited benefits that can be derived from the application of high technology in information processing and management are more relevant in the context of economies with firm industrial bases and the know-how for managing both the hardware and software components of these technologies. There is a school of thought

that developing countries can skip the industrial hurdle and jump straight into the era of high-tech information. This is as unrealistic as it is dangerous and misleading to those countries to whom it is being peddled. Such systems require careful planning at the highest policy levels. We have not been able to achieve that even for basic information. Many of the new technologies require more highly skilled workers than the traditional systems. How do we meet this need in our present circumstances? These systems are said to be cheaper than, say, a decade ago when they were comparatively new on the market. This comparison is relevant in the rich countries. In the present African context, they are expensive and out of reach of most countries. They are also not very relevant because infrastructurally Africa is not ready. If, however, we are thinking seriously of adopting the new technologies, if we are convinced that they are the answer to our problems, then it is important, in terms of educational planning, to begin to train the labour force that will be charged with their implementation."

Said another respondent, "For cost-effective application, the new technologies in the African environment require efficient and advanced telecommunications systems. Internal telecommunications are inefficient and plagued with constant breakdowns. Electricity services are equally inefficient with blackouts and unsatisfactory levels of supply. Breakdowns may result from lack of spares or insufficient know-how on the part of maintenance personnel. High technology does not develop under such conditions."

This opinion was accompanied by unsettling news from a North American agency managing a national collection of scientific and technical information: "We are now receiving approximately 75% of document orders by some form of electronic mail. There are signs that fairly soon libraries may refuse transactions that do not come in through a protocol-based system. This could provide yet another impediment to the transfer of information to developing countries."

One respondent commented on the risk for increasing dependence on the North by purchases of software and hardware: "The implication of wholesale transfers of information technologies has not been subject to any in-depth study and the repercussions are thus unclear. African countries, with their minimal industrial base, will not be in a position to take the bold independent stands of India or Brazil in the foreseeable future. Increasingly, advanced communication and information technologies are purchased not transferred. Worse than the importation of hardware, dependence on industrial countries for software induces reliance on others for data processing research and design functions and moves us still further away from achieving our own capabilities. There is a need to develop information consultancy services and a need to build up the national capability in the design and installation of computer systems."

An inherent difficulty was noted by another respondent: "One of the main factors affecting the costs of information technology is the costs involved not only in acquiring but in maintaining logistical support -- management, engineering, and technical activities concerned with

requirements, design, supply, and maintenance to support objectives, plans, and operations. A great portion of costs stems from management and technical decisions made during the early phases of the planning and design of advanced systems. Governments could consider mandatory publishing of life expectancy curves and dead-time estimates as well as average costs of a product; they could establish standards in reliability and logistical support or at least refer to the international standards that are most appropriate for a particular environment; give preference to suppliers with strong financial ties or links with the country; use Unesco coupons to purchase spare parts; order full technical information so that local repairs can be made where possible; ensure access to the source codes for software; search for packages that use standard computer languages; and examine carefully the training component in the sales contract (never less than 50% of the total training). Direct support by a manufacturer should be mandatory. Costs of technology derive from the development, construction, manufacturing, logistical support, and losses to the user during times when the equipment is not functioning."

Still, one respondent pointed out that computers are not new in Africa: "Many computer installations exist in Africa and much information can be extracted and elaborated from them. In Kenya, as an example, computerization started more than 20 years ago, and today the country has about 200 mainframes installed. Despite this rather long experience in the use of computers, utilization is still alarmingly low. The government computer centre in Nairobi reported lately that more than 90% of installed computers in Kenya have their power turned on fewer than 12 hours a day. I suggest a survey of accumulated experience (and not just success stories, which teach us less than failures)."

Along these lines, someone noted: "Recently the Commonwealth Secretariat mounted a project in East and Southern Africa, the objectives of which are to carry out a comparative study of experiences with use of the new information technology by governments in the region; assess the current impact on management systems, organizational structures, and policy frameworks that have evolved in response to technolcgical needs; and identify and evaluate the adoption of new technology for information handling."

From anglophone Africa, a respondent said: "The indiscriminate introduction of modern electronics-based information technologies in developing countries has often resulted, in the past, in the multiplication of information equipment subsequently grossly underutilized for lack of trained personnel to operate it and adequate databases. Information services must be established to serve, above all, the needs of the users and not merely in response to selling techniques adopted by the agents of manufacturing concerns."

Said another: "There are tendencies either to ignore totally or to embrace blindly a new technology. The obsession with technology rather than its resourceful applications makes important the planning of a national policy and strategy for the judicious use of informatics technology."

Frustration with optimistic claims was clear: "It is believed in certain quarters that Africa's development problems can be solved by the introduction of informatics. The idealists are convinced. Sweeping and unhelpful generalizations, applied in the African context, show clearly how far removed some of our Western colleagues are from the truth and the realities of the African situation. African libraries are failing to benefit from the new technology and are not on line to the technological advances and the new opportunities. On the contrary they are very much off line to anything -- to basic printed resources, let alone new technology."

Among those who believed that computers had something to offer Africa was a respondent from an international agricultural research agency who said: "In the field of agricultural research management, the International Service for National Agricultural Research (ISNAR) has recognized the importance of strengthening managers' access to organized information sources. In Morocco, it is currently working with INRA (Institut national de la recherche agronomique du Maroc) to establish a computerized program and budget system that records the financial and human resource requirements of individual research projects, providing management with a detailed record of input needs and an aggregated budgetary overview by research program. ISNAR is also creating a database on the funding and human resources in national agricultural research. The difficulties are in the regular updating of information because those who are asked to supply information either do not see the results or do not see that the usefulness of the information to themselves is as great as the costs of providing it."

Also, a regional institute that trains information specialists in West Africa submitted a document detailing the software it had developed for database management. The institute commented that the availability of computers has affected all nations -- no matter how technologically advanced. The thesis was that the technologies have made transfer of knowledge practically instantaneous and that unless Africa absorbs them it will be left further behind. The institute maintained that some of the tools can now operate much more reliably in the tropics than they could 10 years ago, although, said the institute, the conventional equipment -- large computers and minicomputers -- requires powerful air conditioning equipment and stabilizers for the electric current: "By way of example, breakdowns in some countries have led to a central unit being inoperative for several months and holding up the payroll of entire administrations. This forced the employees to handle the payroll manually while they waited for the delivery of the spare parts and for the maintenance service to effect the repairs."

In contrast, the microcomputers are less sensitive to the heat, are easier to maintain, and can be shipped to service representatives.

Similarly, the institute was optimistic about the potential for programing and adapting software for the microcomputers. Cooperating with a university in Canada, the institute has begun setting up communications networks, revising software packages, etc.

The institute's optimism was shared by a few others. One respondent from East Africa said: "Lower the tariffs on equipment. A single exposure to the tools increases the chance for improving one's own and society's productivity. In fact those concerns that have resisted the introduction of new technologies have weakened competitiveness and are jeopardizing jobs. The more outgoing sectors of the economy -- stepping up productivity by implementing technological innovations -- are in fact creating new jobs."

A few respondents identified specific changes for bibliographic software used in automation of libraries. Said one: "IDRC's priority should be to improve MINISIS in terms of compatibility and certain library in-house activities. It would then be more applicable to the needs of national and university libraries."

Said another: "A good foundation may be growing for sharing information on microcomputer applications for libraries and documentation using INMAGIC and CDS-ISIS."

According to a respondent from the International Center for Living Aquatic Resources Management (ICLARM): "CDS/ISIS software for microcomputers is the ideal bibliographic tool and it is already finding wide use in Africa; in Nairobi, there is even a user's group."

One respondent outlined the ideal software for documentalists: "The analysis of typical library or information centre needs in a developing country shows that the computerization of essential procedures and services requires a number of general software features and functions:

- o Powerful and flexible online input, data management, and retrieval facilities.
- o High degree of user friendliness (resource directory, expanded help and error messages, search term truncation, possibility for multilingual commands, etc.).
- o Support of various character sets in non-Roman alphabets.
- o Support of general library management applications such as acquisition control; lending and circulation control; as well as of thesaurus maintenance.
- o Support of connection to external online information retrieval systems.
- o Support of as many different forms of output as possible (computer output, microfiche/microfilm, photocomposition, compact disk/read only memory).
- o Support of SDI.
- o Extensive user and system documentation available in different languages.
- o Compatible where possible with other packages already in wide use in developing countries.
- o Standard formats for exchange of bibliographic information."

Other respondents commented about the utility of different information tools. For example, "The day it will be possible to have an integrated publishing press on top of a desk, the computer will be of greatest use for information centres in Africa."

And, "Microfiche remains essential to facilitate the storage and retrieval of important fugitive materials that often escape the attention of sectoral scientists."

Finally, "Among the information tools for francophone Africa is a catalogue of university periodicals; it is methodically prepared at the university library in Abidjan."

BUILDING THE INFORMATION INFRASTRUCTURE

The perspectives on infrastructure development varied widely and were contradictory; however a simple imperative came from an international research agency and for this demand there were no dissenters among the replies: "Please address the publication of scientific and technical information and the relations with media in disseminating it."

One respondent outlined the overall requirements for an information infrastructure: "In Africa we need integrated systems of information incorporating reference libraries, databanks on resources, publication services, etc. and these must be linked with the national bureaus of statistics as well as the offices for rural radio."

Debate revolved around the approach. Three respondents believed that pan-African or subregional approaches are essential for project development:

"Strengthening of mission-oriented information systems such as AGRIS and INFOTERRA is important, not only for the subsaharan region but for the worldwide exchange of information."

"Regional information systems such as PADIS should be strengthened."

"There is a lack of communication between groups and institutions within the region in spite of common problems. Even within a country, resources are largely uncoordinated and there is no effective network established to tap resources elsewhere."

Another respondent called for concerted efforts to rectify the lack of coordination: "On the one hand there is an increase of interest in management of information, and on the other there is a marked lack of coordination on the part of national and international agencies in response. We have recently sought to encourage cooperative work between countries to derive strategic thinking of benefit to a wide audience. We cannot make agencies work together but we should at least be able to exchange information on progress and on plans."

ILO is among the organizations moving in the direction of regional information sharing, according to the reply from there: "The International Labour Office would like to cooperate with the Economic Commission for Africa to develop an information program. Any initiatives would aim to be compatible with PADIS standards. The only documentation activity we have planned for Africa in the next biennium

is a seminar on labour information for labour administration programs, labour ministry officials, and ILO staff in the region."

The reply from the World Health Organization noted: "Since the WHO literature services program was launched over 10 years ago, the regions have been working toward their self-determined goals. The program emphasizes library cooperation and regional self-sufficiency. Unfortunately, the health libraries in Africa lack trained staff, financial resources, and equipment; above all, they lack networks. Our activities have been essentially aimed at the training of health library personnel (seminars have been held in Arusha and Dakar). Until recently WHO was able to finance a limited number of photocopies and MEDLINE searches, but the service is unlikely to continue much longer. We are trying to identify local resource libraries on a subregional basis that would be willing to provide photocopies of periodical articles for a small fee to health libraries and workers within their region."

The difficulties in setting up large information networks were underlined in a response from the UN Advisory Committee for the Co-ordination of Information Systems,"The United Nations Centre for Science and Technology for Development has shelved the global information network for the time being because of lack of funds but it will be producing a directory of science and technology information services in the UN system at headquarters and field offices and other locations."

The bulk of respondents pointed to national level activities as the essential building blocks.

Said one: "Support for regional cooperation in information systems is gaining ground in Africa because there are international foci in the form of the various economical and political groupings such as the Economic Commission of West African States (ECOWAS) and SADCC. These can only succeed when there are articulated and viable information infrastructures at the national level to form the base. High-level politics can play a negative role and frustrate regional cooperation if a sound base is not in place from which to negotiate vested interests. The still-born SADIS °Southern African Documentation and Information System§ venture is an example. One would expect a continental umbrella information organization like ECA-PADIS to perform an advisory and coordinating role in these matters. Its leadership role so far in this respect has been limited."

In sum, said another: "National information networks must be developed or strengthened before we can contemplate regional, continental, or international networks."

The same sentiment was clear in a response from Canada: "We assume that you are concerned not only with the transfer of scientific, technical, social, and economic information to subsaharan Africa but also with its development, dissemination, and application within the region. Many people in the region have the knowledge and skills to determine the needs with respect to transfer, but their efforts are

hampered by inadequate databases. The methods of analysis often exceed in sophistication the quality of the data to which the analysis is applied. We recommend that consideration be given to the support of basic data collection and the examination of techniques and technology appropriate to the institutional and research environments of subsaharan Africa."

An African respondent said: "Priority should go to strengthening national information services but only by avoiding the development of uncoordinated services. The approach should be to create or strengthen specialized information analysis centres and national databases; initiate national committees to coordinate the development of information services; provide education at the graduate level as well as continuing education for information personnel; enhance the demand for information through user education; strengthen contacts with international and regional systems that will search commercial databases; and in the long term acquire or gain online access to foreign databases."

Another respondent said, "Establishment of national systems in Africa has failed because of the refusal by the lords of the archives, libraries, and documentation centres to leave the empires that they created at a time when it was unthinkable to talk of coordination of all information activities at the national level. We propose the establishment of a national system in each country:

- o A national council for documentation and information in charge of defining the national policy in matters of scientific and technological information and establishing the national plan for information.
- o A directorate of documentation and information charged with the responsibility of carrying out the decisions of the national council, coordinating training and national activities, assisting in the establishment of the national network through national subnetworks and working at the creation of sectoral centres. This directorate should not be a pilot information centre. The directorate should be attached to the Office of the President.
- o A network of sectoral centres using the same standards and compatible software packages."

Some countries are currently planning systems: "It is hoped to set up a computer systems network that will link the planning committee to regional planning offices and other institutions for national resource planning. The needs have been identified as being the creation of an inventory of natural resources (disaggregated and regionally homogeneous); the establishment of a system of economic and social data from the central and local level and field surveys outlining procedures for future updating; development of computerized data transfer, entry, storage, updating, and retrieval in all suitable forms; design of appropriate tools for analysis and planning, and forecasting using macro models, input-output tables, etc.; and research tools for the solution of selected problems of planning in a regional/national systems framework."

Standardizing is one concern: "A national committee has been set up under the central statistical office to coordinate the use of computers, ensure the standardization of information processing and transmittal methods to allow for multiple users, determine the actual needs of systems requests and their compatibility with existing and planned systems, issue indicators and ratios that will help assess the need for and rate of technological absorption, and give policy inputs to government. The composition of the committee includes systems analysts and software engineers."

One respondent cautioned against attempting to effect development from the centre: "Economic development is a local phenomenon, not a regional, national, or subregional one. The consequences of a macro approach can be seen in the heavy centralization of development, with all its social disruption in many countries. The growth occurs only in the centre; so it is with macro strategies for information, which reinforce centralization. The transfer of information into effective economic and social action takes place at the local level."

Others agreed that centralization was not the best route to take: "Associations have a big role to play in strengthening cooperation and coordination within national systems since government ministries place a higher priority on control of than on access to information."

Someone else said: "In all the countries where an attempt has been made to organize information activities, the structure created very often does not meet the approval of different sectors concerned mainly because of strict centralization and poor planning of the tasks assigned to the national system."

One respondent presented an example where centralization didn't work: "The setting up of a national information system (NATIS) constitutes the kingpin of Unesco's program but is the one against which the development of information in the African context has come to grief. The assumption was that governments needed to be involved at the policy level first of all and would then have sufficient continuing interest to commit funds for policy implementation. But as of now, most African governments have not been able to establish NATIS and their information policies are still ill-defined. A suspicion that has become a conviction is that policymakers lack awareness and a commitment to the importance of information in decision-making. This argument can be countered by the fact that in traditional society, the mode of governance and decision- making is based on consultations at various levels. Hence for example the proverb of the Akan of Ghana, which says one head does not make a decision. In fairness to our policymakers, ignorance of the importance of information is by no means the only reason for the low priority of information in national planning. With 80% of foreign exchange earnings going into repayment of interest on massive foreign debts it is not surprising there is severe narrowing of priorities. People will riot when food is scarce but shortages of books are barely noticed by the general populace because their effects, though devastating, are long term and lacking in drama."

The pros and cons of sectoral information systems were also given attention by respondents. Said one: "IDRC will do this region a great favour if it does not insist on dividing information systems along artificial sectoral lines currently being perpetuated. To insist on sectoral development is indeed to pretend that information and communication are not meant to have an impact on the overall national development effort."

On the other side was: "The major impact of computers would be in establishing management information systems to aid planning as well as enhance decision-making in resource allocations and management of complex projects. The choice of applications must match the development priorities set by government such as utilization of natural resources, agriculture, land records, meteorology, trade, industry, national statistics, demographic patterns, health statistics, etc."

A respondent from East Africa agreed: "There is a need to provide vehicles through which African policymakers, planners, and researchers can be assisted with socioeconomic information resources. Because of the needs to respond to clearly identified user characteristics, socioeconomic information (SEI) networks should be related to narrow sectors concentrating on specific topics such as population, education, law."

Said another: "SEI should separately cover information needs for governments, parastatals, and private enterprises. Governments need policy and control-oriented information. Public and private enterprises need implementation- and performance-oriented information.

According to someone else: "The demand for economic and social information is greater or at least longer standing than the demand for scientific and technological information. This is the result of the need of the state to exert control and of the economic managers to plan development and other efforts. Thus, statistical systems have been in operation for a long time, sometimes from the preindependence days. For scientific and technological information, promotion of demand would seem to be worthy of inclusion in a strategy for Africa."

One respondent stressed that, at present, the results of agricultural research are in the hands of a few and, hence, researchers are marking time. This submission asked: "How is documentary production to be surveyed? How is the database to be fed? How does one go about organizing national documentary holdings on microfiche?"

Someone else analyzed a system for agricultural research documentation and called for enhanced national services to provide:

- o A central documentation and retrieval system for reports, data, research studies, and extension messages.
- o Systematic access to information on research design, planning, and results from external sources, data for policy formulation and facts (like pesticide toxicity) for service programs.
- o Current-awareness services to enable professionals and technicians to stay abreast of their fields.

- o Central controls and coordination of budgets and expensive print materials.
- o A system to support researchers stationed in different locations, particularly outposts.
- o A system to preserve and provide access to materials already present.
- o A campaign to increase people's understanding of research methods and sources of information and to counteract the general view of libraries as warehouses.
- o A career structure for information workers in government.
- o A variety of publication fora to encourage documentation of research efforts.

Said another: "The urgency of land-use planning and the generation and processing of land information could not be overemphasized. Land-use data are dynamic and require periodic updating. The only present land- use plan is based on the capital metropolitan area but experience with this plan is valuable as a pilot project."

One respondent suggested: "...the development of an inventory of uncompleted projects with a view to incorporating their completion in future planning -- housing projects with foundations and walls but no roofs; bridges with only half the decks finished or with no ramps from the road; dams complete but still no irrigation scheme designed. These all seem to be cases of failure to realize benefits from major investments."

Another practical suggestion was: "Former colonies could derive great benefit from having access to information on the work done by researchers and technicians during the colonial period. A recent pilot project (between France and Vietnam) has shown that three elements are needed for successful ventures to provide such access:

- o The structure, within the beneficiary country, for the reception, handling, storage, and dissemination of such documentation;
- o The common aim of the two governments; and
- o The willingness by former colonialists to take inventory of the data and reproduce the useful documentation (judged by specific criteria)."

Others promoted their organizations' proposed or current activities. For example: "ICLARM could assist in the provision of information on aquaculture. The proposed service illustrates the virtual absence of African outlets for research results. A regional journal would be ideal but a newsletter would make a good beginning in reducing the isolation of individual scientists."

Another provided examples of what libraries could do as part of the national network: "They should explore cooperative or shared acquisition on the basis of subject allocation; selective abstracting to assist researchers to reach materials buried in existing periodicals; preparation of SDI research profiles and bibliographies in anticipation of needs, not just on demand; research on library issues; agreements for the production of national union catalogues as the basis

of interlending; cooperation in curriculum revision in African library schools; seminars on national or regional information resource sharing offered to government departments and permanent secretaries of ministries involved in information services as well as librarians."

The respondent saw these activities as possible despite the lack of funding and resources: "Libraries work in isolation, duplicating scarcely affordable resources and wasting the enormous gains that could be made from sharing. Legitimate frustrations and feelings of hopelessness in the face of debilitating shortages in every sphere of life have smothered imagination and sapped initiative among Africa's information professionals. They sermonize to donor agencies at library association meetings instead of engaging in useful discussion of practical proposals for equitable use of existing resources."

FUNDING

The shortage of funds was acknowledged implicitly in many of the responses; a few dealt with it explicitly. Several noted the problem of collapse of information services after withdrawal of donor support. Some had recommendations on how to improve results from donor assistance.

Said one: "Assistance in the past often stopped with a consultant's report. Pilot projects are more successful where the consultant is involved in proposing, planning, and in implementing."

Another commented, "Project funding should provide for strong links to an institution in a donor country."

Someone else said: "Optimum duration of funding is 5 years renewable."

The ever-increasing constraints on funding for information systems and services in both developed and developing countries were the focus of a response from a Canadian agency with responsibility for national collection and handling of information on science and technology: "In the current climate of constraint, it is increasingly difficult to meet our national demands. There has been increasing talk of cost recovery; for example, one university now charges CA$11 for an interlibrary loan. In such a climate African institutions will not be able to depend upon industrialized country information services. Our national collection of scientific and technical literature represents an investment of many millions of dollars over many years. It is doubtful whether such a collection could be put together again. The most active part is the most recent part. If we were starting again, we would probably go back no more than 5 years and depend on other sources for the older material."

Funding constraints and their implications were given a different slant, albeit pointing in much the same direction, in a response from an international agency: "A viable strategy for subsaharan Africa should emphasize the development of self-reliance by African institutions in dealing with their information and communication

problems. For West Africa, our organization's experience is that the information activities are not funded well enough to make an impact on scientific and technical research; the lack of trained and skilled personnel in information handling and in exploiting the wealth of information sources and systems elsewhere in the world exacerbates the shortage of resources; and policymakers and decision-makers and heads of scientific research institutions need to be sensitized to the value of information in development so they can view investments in information processing as an integral part of investments in development."

In sum, funds are expected to become harder to get so professionals in information handling, researchers, academics, government personnel, extension workers, etc. in developing countries must all derive the maximum possible from the resources available. Also, donor agencies increasingly must work together to make their monies go as far as possible. Evidence is that the agencies are recognizing this imperative. One respondent said: "In an effort to learn about the state of scientific and technical information activities in developing countries and what the needs were, the United Nations Centre for Science and Technology for Development wrote to all developing countries late last year. Replies included requests for aid in human resources development, networking, funding, etc. The Centre would be interested in cooperating with IDRC in rendering assistance if the requests fit your strategy and plans."

The goal is to improve the capability in subsaharan Africa for information transfer, adaptation, and use; the ultimate aim is a level of development that enables full participation in the world economy and an acceptable standard of living for the masses.